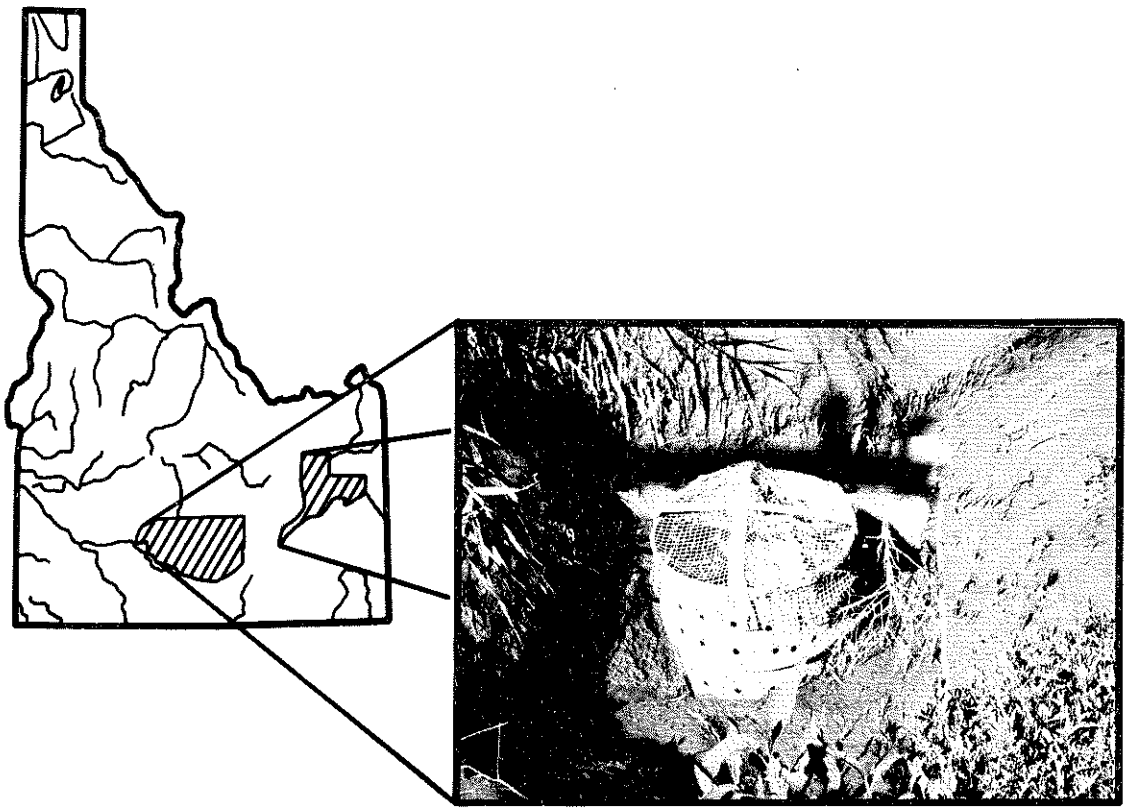
CHEMICAL AND PHYSICAL DATA FOR DISPOSAL WELL, EASTERN SNAKE RIVER PLAIN, IDAHO



IDAHO DEPARTMENT OF WATER RESOURCES
WATER INFORMATION BULLETIN NO. 39
OCTOBER 1974

WATER INFORMATION BULLETIN NO. 39

CHEMICAL AND PHYSICAL DATA FOR DISPOSAL WELLS, EASTERN SNAKE RIVER PLAIN, IDAHO

by

R. L. Whitehead

Prepared by the United States Geological Survey

in cooperation with

Idaho Department of Water Resources

Published by

Idaho Department of Water Resources

R. Keith Higginson

Director

October 1974

CONTENTS

ILLUSTRATIONS

TABLES

TABLES (Cont'd.)

CHEMICAL AND PHYSICAL DATA FOR DISPOSAL WELLS, EASTERN SNAKE RIVER PLAIN, IDAHO

by

R. L. Whitehead

ABSTRACT

About 5,000 disposal wells are reported to be in use in Idaho. Some of these wells are used to dispose of runoff from agricultural lands and city streets. Others are used to dispose of domestic and industrial wastes.

From May 1972 to April 1973, 119 disposal wells on the eastern Snake River Plain were visited and information on them collected. Depths of the disposal wells visited ranged from 35 to 488 feet (11 to 149 meters) and averaged 102 feet (31 meters). Most of these wells were so shallow as to not extend to the underlying water table. Flow rates into the wells ranged from less than 0.01 to 3.7 cubic feet per second (0.28 to 100 liters per second) and averaged about 0.48 cubic foot per second (2.3 liters per second).

One hundred five water samples were collected from 55 irrigation-disposal wells, 14 city-street drain wells, 5 canals, 1 diversion ditch, 2 sites on the Snake River, and 1 domestic well. The samples collected were analyzed for 30 different chemical parameters although not all parameters were determined for each sample. Of four samples analyzed for pesticides, two contained detectable concentrations of some constituents. One of these samples contained traces (0.01 to 0.04 microgram per liter) of DDE, DDT, dieldrin, chlordane, diazinon, and silvex, as well as 0.26 microgram per liter of 2,4-D; the other sample contained 0.01 and 0.02 microgram per liter of DDT and DDE respectively. Oil and grease concentrations in 10 city-street drain samples ranged from 11 to 4,000 milligrams per liter and dissolved-lead[1/] concentrations ranged from 19 to 1,600 micrograms per liter. One sample of irrigation-runoff water contained 4 milligrams per liter of oil and grease and less than 100 micrograms per liter of dissolved lead. Analyses of water samples from irrigation-disposal wells and city-street drains showed a wide range of values for sediment, turbidity, total and fecal coliform bacteria, and fecal streptococci bacteria.

INTRODUCTION

Approximately 5,000 disposal wells are estimated to be in Idaho (Abegglen and others, 1970). Most of the wells inject irrigation-runoff water, runoff from city streets, septic-tank wastes, and wastes from a few industries into the basaltic aquifer of the Snake River Plain (fig. 1). Despite the many disposal wells reportedly in use, little information has been available on the rates of inflow and the quality of the waste water entering these wells.

1/ Material passing 0.45 micrometer filter; may include finely divided particulate matter.

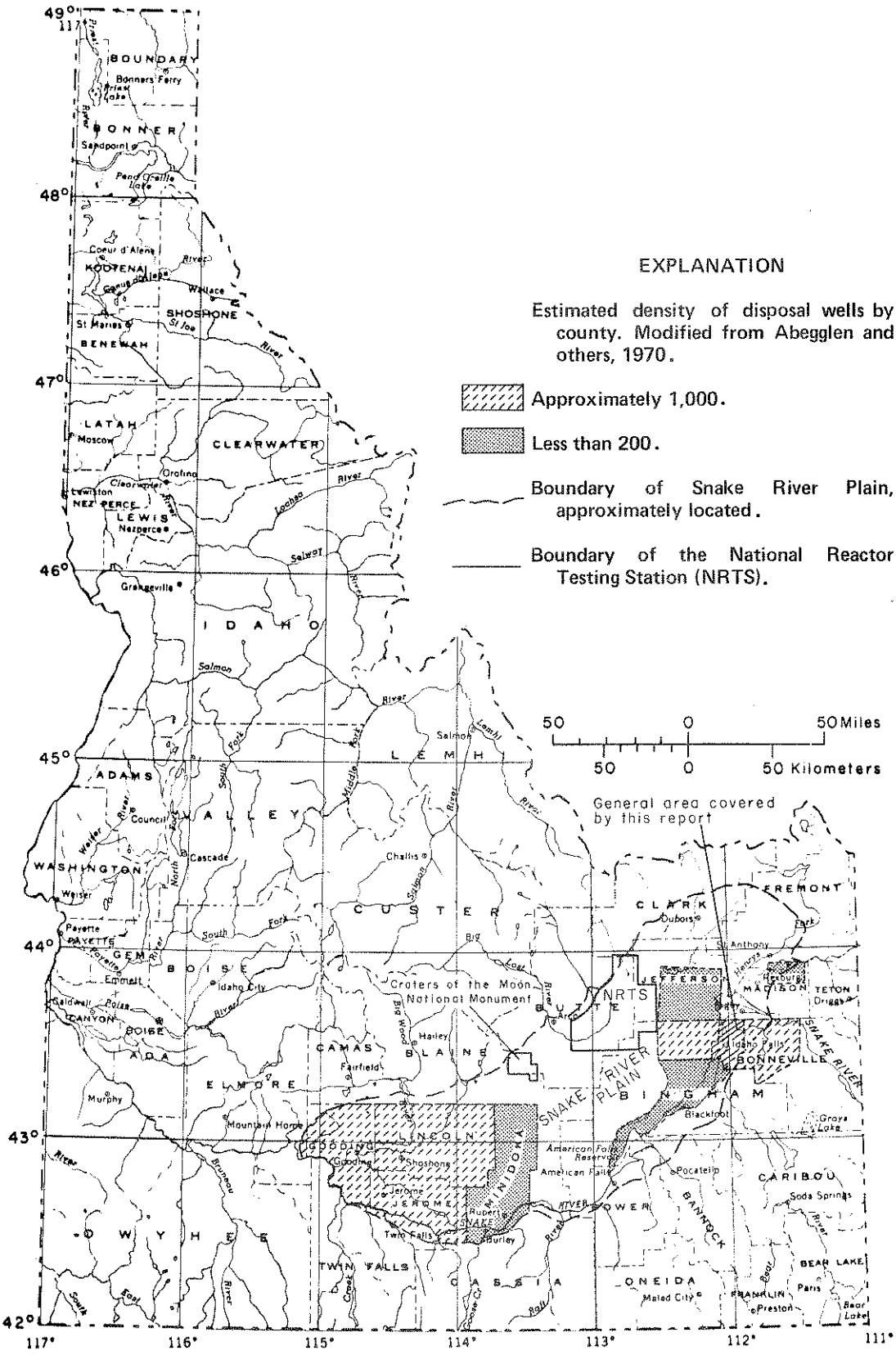


FIGURE 1. Index map of Idaho showing estimated density of disposal wells and the general area covered by this report.

Studies by Smith and Douglas (1973) and Bondurant (1971) provided some data on the quantity and quality of irrigation-runoff water entering subsurface drains after passing through the soil zone. Also, reports of the U. S. Geological Survey (Barraclough and others, 1966 and 1967) describing the dispersion of radioactive wastes injected into the Snake Plain aquifer at the U. S. Atomic Energy Commission's National Reactor Testing Station are available (fig. 1).

Purpose and Scope

Public concern for the protection of the quality of the water in Idaho's aquifers resulted in the Idaho State Legislature establishing a permit system to control the use of disposal wells in the State. However, to apply a permit system effectively and to evaluate the effects of the use of disposal wells on the State's aquifers, information regarding the existence and location of disposal wells, and on the quantity and quality of the waste-water entering these wells is needed.

The Idaho Department of Water Administration (now the Idaho Department of Water Resources), the State agency responsible for implementing and administering the permit system for Idaho, initiated a continuing inventory of disposal wells in 1972. Its initial effort is being concentrated on the Snake River Plain, where most of the wells are thought to be located (fig. 1), with a complete statewide inventory as their final goal.

The U. S. Geological Survey, in cooperation with the Idaho Department of Water Resources, started a program in 1972 to determine the rates of flow and the quality of the waste waters entering a selected number of the disposal wells inventoried by the Idaho Department of Water Resources.

Data from the Idaho Department of Water Resources' inventory were used to select wells for sampling and for measuring flow rates. Where possible, rates of inflow to wells were measured using standard techniques, however, in some instances only estimates of inflow could be made. Field determinations of several quality-of-water parameters were made in a specially equipped mobile field unit to insure accuracy of results. The parameters measured in the field are:

1. Total coliform bacteria
2. Fecal coliform bacteria
3. Fecal streptococci bacteria
4. Dissolved oxygen
5. Hydrogen-ion activity (pH)
6. Specific conductance
7. Temperature

All other chemical analyses were made in laboratories of the U. S. Geological Survey. About 25 percent of the samples collected were analyzed for common ions, nutrients, and total organic carbon content; four samples were analyzed for pesticides. Samples from 10 city-street drains and one irrigation-waste water site were collected and were analyzed for oil, grease, and dissolved-lead concentrations in addition to the parameters mentioned previously. The data collected and presented herein are descriptive of 119 disposal wells in

use and of the general character of the liquid wastes entering disposal wells in the vicinity of Idaho Falls which is in the eastern part of the Snake River Plain, Idaho.

Sampling-Site and Well-Numbering System

The well-numbering system used by the U. S. Geological Survey in Idaho indicates the location of wells within the official rectangular subdivision of the public lands, with reference to the Boise base line and meridian. The same numbering system is used for all sampling sites in this report even though some of the sample sites were at canals or on the Snake River. The first two segments of the number designate the township and range. The third segment gives the section number, followed by three letters and a numeral, which indicate the quarter section, the 40-acre (16 hectare) tract, the 10-acre (4 hectare) tract, and the serial number of the site within the tract respectively. Quarter sections are lettered a, b, c, and d, in counterclockwise order from the northeast quarter of each section (fig. 2). Within the quarter sections, 40-acre (16 hectare) and 10-acre (4 hectare) tracts are lettered in the same manner. Well 2N-37E-14ddd1 is in the SE¼SE¼SE¼ sec. 14, T. 2 N., R. 37E., and was the first site inventoried in that tract.

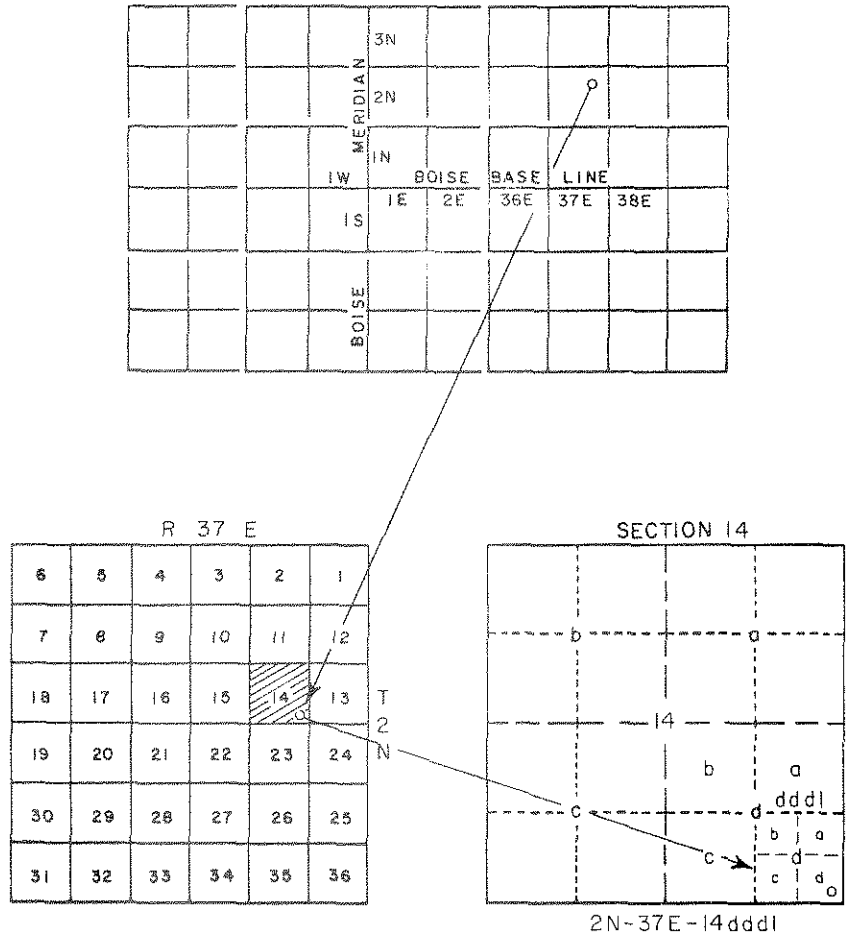


FIGURE 2. Diagram illustrating sampling-site- and well-numbering system.

Use of Metric Units

The International System of Units is being adopted for use in reports prepared by the U. S. Geological Survey. To assist readers of this report in understanding and adapting to the new system, many of the measurements reported herein are given in both units. In addition, table 1 and the factors listed below are presented as an aid to conversion from one system of units to another. Chemical data for concentrations are given only in milligrams per liter (mg/l) or micrograms per liter (µg/l) because these values are (within the range of values presented) numerically equal to equivalent values expressed in parts per million, or parts per billion, respectively.

Multiply English Units	By	To Obtain SI Units
	Length	
inches (in)	25.4	millimeters (mm)
	.0254	meters (m)
feet (ft)	.3048	meters (m)
miles (mi)	1.609	kilometers (km)
	Area	
acres	4047	square meters (m^2)
	.4047	hectares (ha)
	.4047	square hectometer (hm^2)
	.004047	square kilometers (km^2)
square miles (mi^2)	2.590	square kilometers (km^2)
	Volume	
gallons (gal)	3.785	liters (l)
	3.785	cubic decimeters (dm^3)
	3.785×10^{-3}	cubic meters (m^3)
million gallons (10^6 gal)	3785	cubic meters (m^3)
	3.785×10^{-3}	cubic hectometers (hm^3)
cubic feet (ft^3)	28.32	cubic decimeters (dm^3)
	.02832	cubic meters (m^3)
cfs-day (ft^3/s-day)	2447	cubic meters (m^3)
	2.447×10^{-3}	cubic hectometers (hm^3)
acre-feet (acre-ft)	1233	cubic meters (m^3)
	1.233×10^{-3}	cubic hectometers (hm^3)
	1.233×10^{-6}	cubic kilometers (km^3)
	Flow	
cubic feet per second (ft^3/s)	28.32	liters per second (l/s)
	28.32	cubic decimeters per second (dm^3/s)
	.02832	cubic meters per second (m^3/s)
gallons per minute (gpm)	.06309	liters per second (l/s)
	.06309	cubic decimeters per second (dm^3/s)
	6.309×10^{-5}	cubic meters per second (m^3/s)
million gallons per day (mgd)	43.81	cubic decimeters per second (dm^3/s)
	.04381	cubic meters per second (m^3/s)
	Mass	
ton (short)	.9072	tonne (t)

TABLE 1

TEMPERATURE–CONVERSION TABLE

°C	°F	°C	°F	°C	°F	°C	°F	°C	°F
-8.0	17.6	6.0	42.8	16	60.8	26	78.8	45	113
-6.0	21.2	7.0	44.6	17	62.6	27	80.6	50	122
-4.0	24.8	8.0	46.4	18	64.4	28	82.4	55	131
-2.0	28.4	9.0	48.2	19	66.2	29	84.2	60	140
0	32.0	10	50.0	20	68.0	30	86.0	65	149
1.0	33.8	11	51.8	21	69.8	32	89.6	70	158
2.0	35.6	12	53.6	22	71.6	34	93.2	75	167
3.0	37.4	13	55.4	23	73.4	36	96.8	80	176
4.0	39.2	14	57.2	24	75.2	38	100	85	185
5.0	41.0	15	59.0	25	77.0	40	104	90	194

°C = Degrees Celsius = 0.56 (°F - 32).

°F = Degrees Fahrenheit = 1.80 (°C) + 32.

DISPOSAL WELLS

A waste disposal or injection well, also locally referred to as a sink or drain well, is defined by the State of Idaho as "any excavation or artificial opening into the ground more than eighteen (18) feet (5.5 meters) in vertical depth below land surface which is constructed by any percussion, rotary, boring, digging, jetting, or augering machine and which is used for or intended to be used for the subsurface disposal of any liquid or solid material which may affect the ground waters of the State of Idaho" (Idaho Department of Water Administration Water Laws and Regulations, 1971, sec. 42-3902).

Wells are used for disposal of five types of liquid wastes:

1. Irrigation and storm runoff from agricultural land.
2. Storm runoff and other wastes from city streets.
3. Domestic sewage.
4. Industrial wastes.
5. Low-level radioactive wastes.

Wells used for the disposal of runoff from agricultural land and city streets are located in topographically low areas so that water can flow by gravity into the well. Wells used to dispose of domestic sewage and industrial wastes are located at convenient sites and are generally covered at the land surface. Wells used for the disposal of low-level radioactive wastes in Idaho are located only on the National Reactor Testing Station which is operated by the U. S. Atomic Energy Commission.

From the users' point of view, the disposal well offers an economical method for disposing of excess water or wastes. Generally, the basalt underlying the Snake River Plain will readily accept large amounts of liquids provided a fractured zone is penetrated by the

well. Most disposal wells are cased only to shallow depths so that most of the fractures penetrated by the well can receive liquid. Figure 3 is a photograph of a rock outcrop showing fractures in basalt. Some of the openings shown are more than 1-inch (25 millimeters) wide along the fractures and are several inches (tens of millimeters) across at fracture junctions. In some places, lava tubes form very large openings, up to tens of feet (several meters) in diameter and hundreds of feet (tens of meters) long (Abegglen and others, 1970), that will accept and transmit large quantities of waste water from wells penetrating these openings.

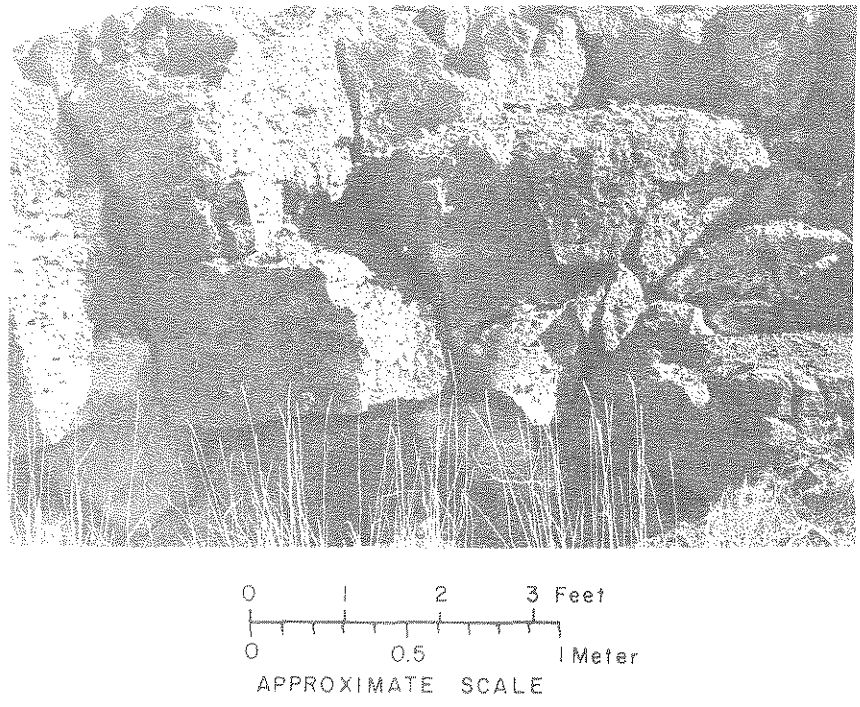


FIGURE 3. A rock outcrop showing fractured basalt.

Studies made in other parts of the United States have shown that most of the bacteria analyzed for in waters injected into fine-grained material having intergranular porosity do not travel more than a few tens of feet (few meters) away from the point of injection (Vecchioli and others, 1972; Crosby and others, 1968; and McGauhey, 1968). However, fractures, joints, lava tubes, and other large openings in basaltic formations may allow bacteria to migrate much greater distances. For this reason, liquid wastes injected into the basaltic aquifer of the Snake River Plain may present a significant potential pollution problem. Also, some ionic chemical constituents, such as nitrate, tend to remain in solution and are not readily removed from the water by filtration, regardless of the type of aquifer materials, or by ion-exchange processes (Scalf and others, 1968). Thus, both bacteria and dissolved chemical constituents in waste water may be a source of pollutants to the aquifer of the Snake River plain.

Irrigation-Disposal Wells

Irrigation-disposal wells are an important part of many irrigation systems on the Snake River Plain. Their principal use is to dispose of runoff from precipitation and snowmelt, and excess irrigation water. Generally, the water to be injected is more or less laden with sediment and with organic debris, such as leaves and twigs. Although most wells have settling ponds that serve to remove much of the sediment, others have none at all. A wide variety of cribs and screens are built around and over the wells for removal of floating debris. Figure 4 shows some typical irrigation-disposal wells, settling ponds, screens, cribs, and other features. Figure 5 shows irrigation-waste water running off a potato field into a low area at the end of the field which acts as a settling pond, the water then flows into the disposal well inside the screened compartment.

City-Street Drain Wells

City-street drain wells are used in several municipalities on the Snake River Plain to dispose of runoff from precipitation and snowmelt (Abegglen and others, 1970). Figure 6 shows three city-street drain wells as examples. Most street drain wells in the Idaho Falls area are in residential areas. Some of the installations have collector basins in low street corners that are connected by tile drains to a well which may be below the road surface and under a cover as shown in figure 6b. Other wells are at low areas along the curb (fig. 6a and c). These receive flow directly from the street's gutter.

Disposal Wells for Domestic Sewage, Industrial Waste, and Low-Level Radioactive Waste

No domestic-sewage disposal wells were inventoried or sampled as a part of this study. Reports by Perlmutter and Guerrera (1970) and Scalf (1968) contain data on domestic sewage that is being injected into the subsurface in other areas. Construction of a typical system for disposing of domestic wastes is shown in figure 7 (modified from Sceva, 1968).

There are only a few industrial-disposal wells in Idaho. The two wells visited were plugged with sediment and no longer in use. In Idaho, most of these types of wells which are in use are used to dispose of dairy or food-processing wastes (Abegglen and others, 1970).

Low-level radioactive wastes are injected into two wells at the National Reactor Testing Station. The chemical quality of the ground water in the vicinity of these wells is being monitored on a continuous basis by the U. S. Geological Survey in cooperation with the U. S. Atomic Energy Commission as a part of a program of ground-water studies being made by these agencies. Reports describing results obtained from these studies are available to the public (Barraclough and others, 1967), and for this reason no water samples were collected at the National Reactor Testing Station for this study.

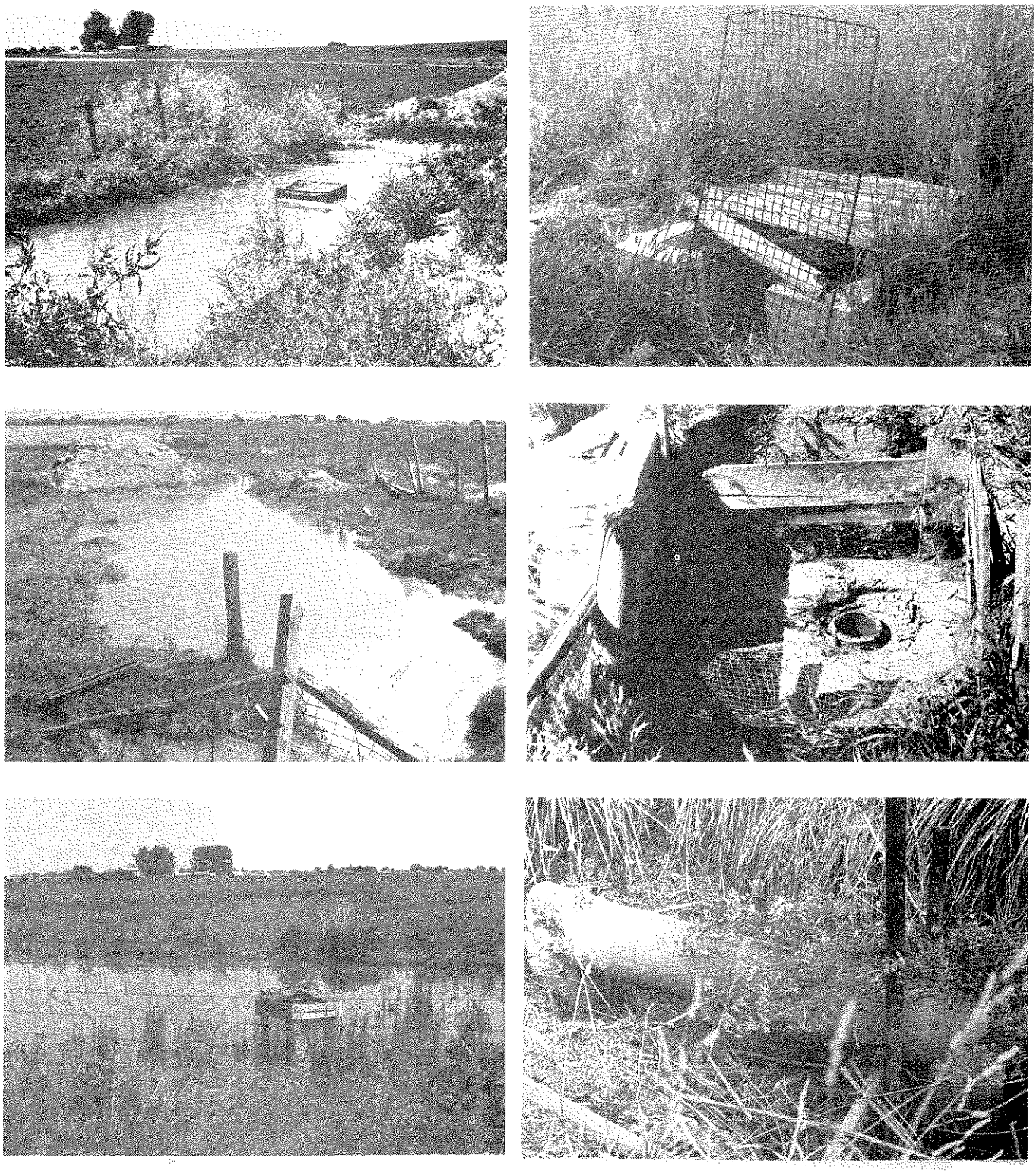


FIGURE 4. Typical irrigation-disposal wells showing settling ponds, screens, cribs, and other features.
(continued on next page)

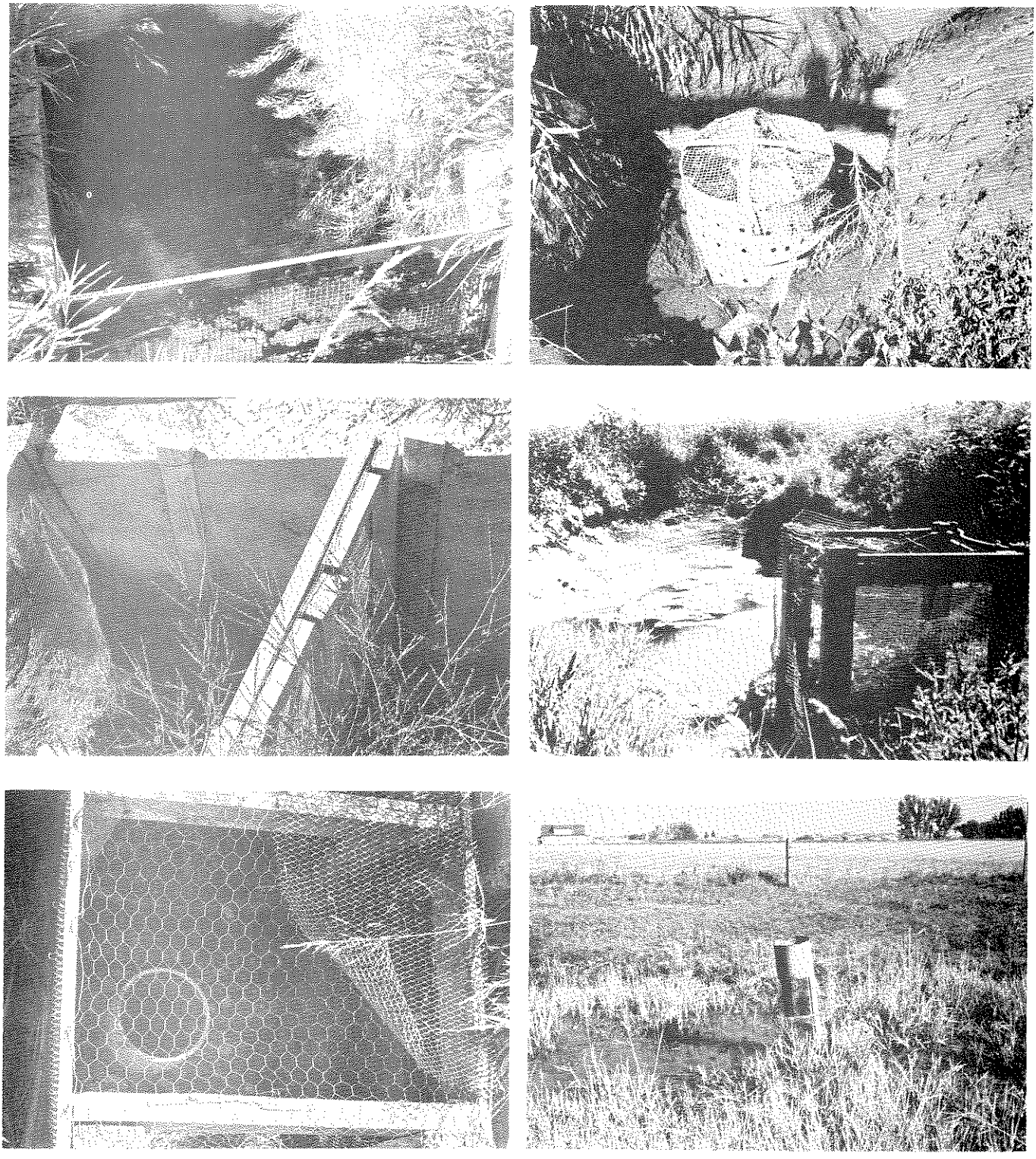
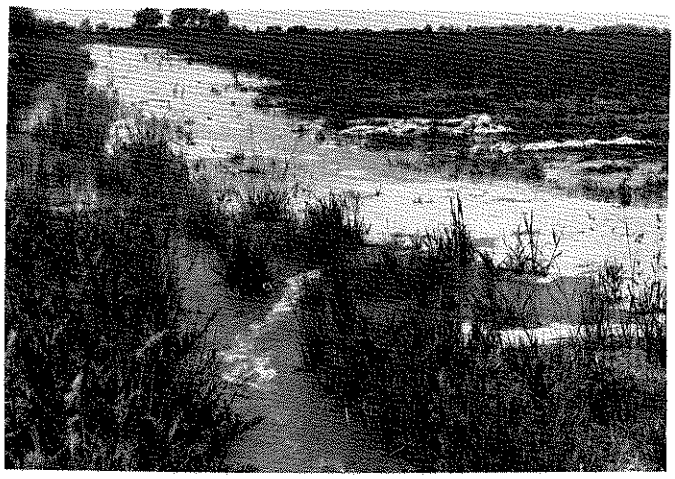
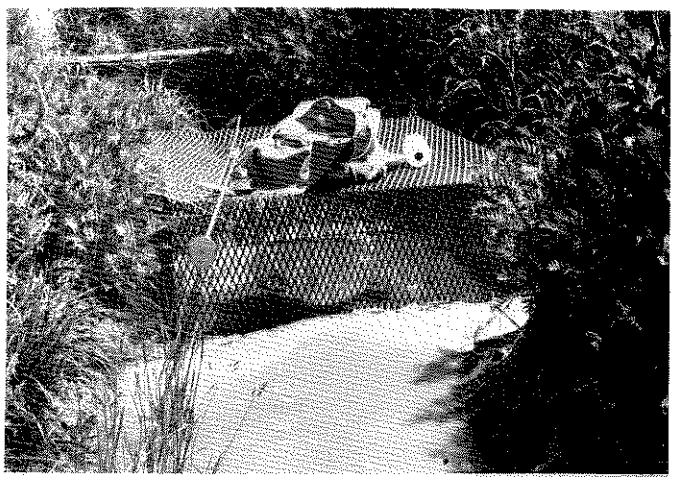


FIGURE 4. (Continued.)

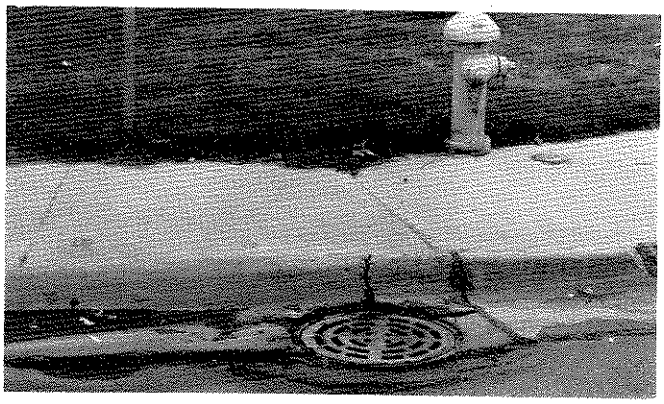


A

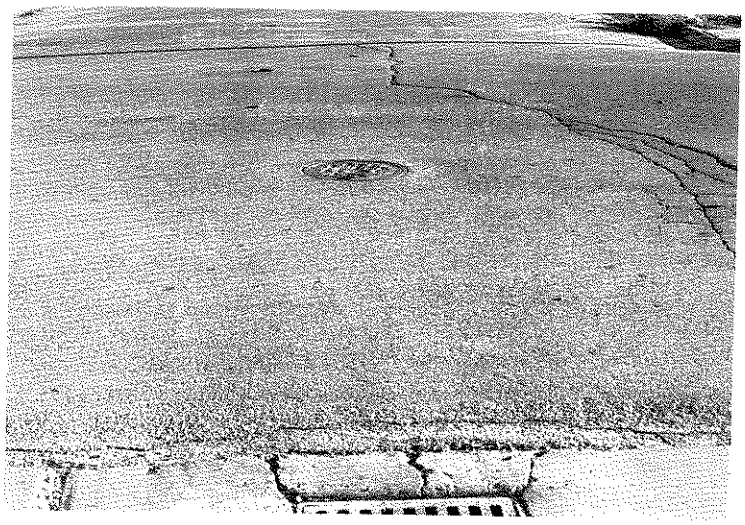


B

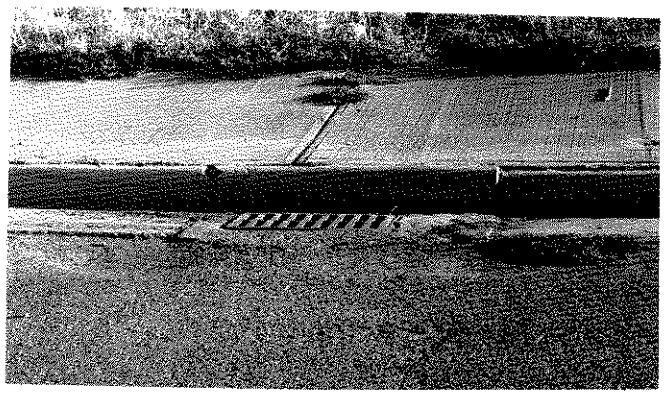
FIGURE 5. Irrigation-waste water running off a potato field (A) and into a disposal well (B). The well is inside the screened area.



A



B



C

FIGURE 6. Typical street drain wells. (A) Well is beneath round steel grate, (B) well is beneath manhole cover in center of intersection with connections to the catchment basins, in the foreground and at the street corners, by subsurface tile lines, (C) well is beneath rectangular grate.

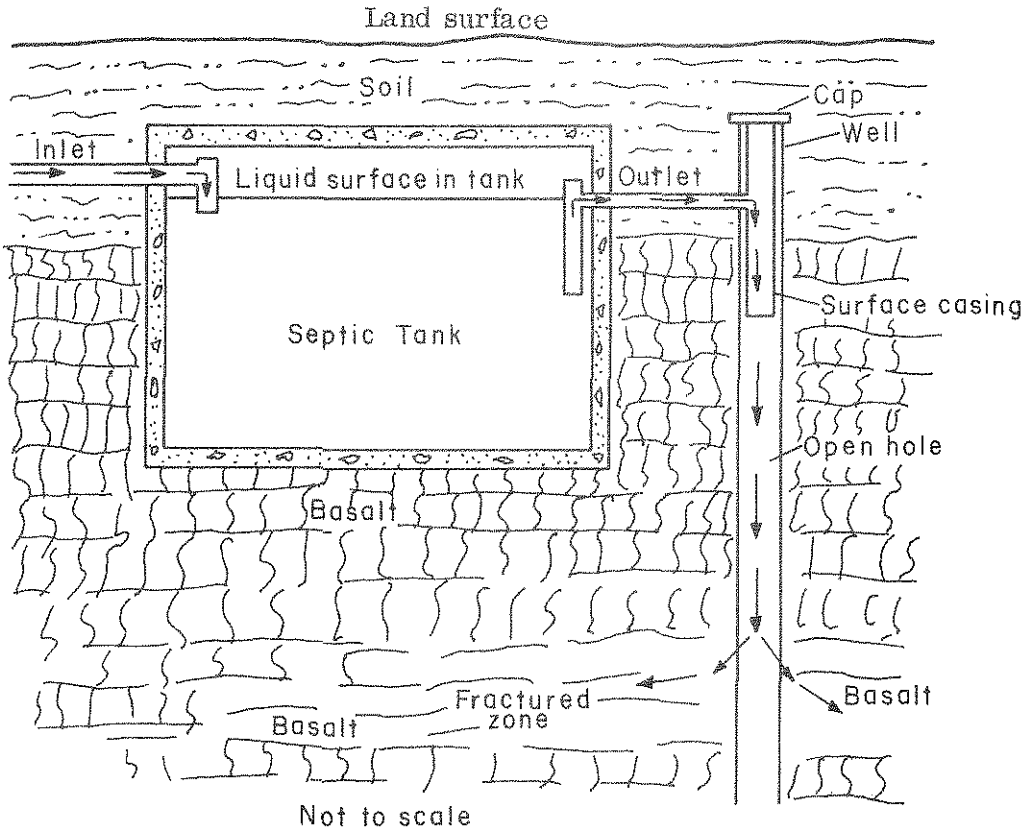


FIGURE 7. A typical domestic septic-tank effluent disposal well. (Modified from Sceva, J. E. 1968.)

PHYSICAL AND QUALITY-OF-WATER DATA

Prior to this study, no published data were available on the quality and quantity of liquid wastes being disposed of by wells in the Snake Plain aquifer except as noted in the previously mentioned report of Smith and others (1973), Bondurant (1971), and Barraclough and others (1966-67). Most of the data for this report were collected in the vicinity of Idaho Falls, Idaho (fig. 1), where disposal wells have been in use for many years and where cases of contamination of domestic wells by disposal wells have been reported (Abegglen and others, 1970). Although this study was not intended to relate contamination of domestic wells to nearby disposal wells, the data presented in this report may be useful to other investigators attempting to establish sources of ground-water contamination.

One hundred nineteen irrigation- and city-street disposal wells were visited and 88 samples were taken of the water flowing into 69 of these wells. A total of 17 samples was also taken from one domestic well, five canal sites, two sites on the Snake River, and one diversion ditch. All the wells visited and all sites that were sampled are shown on figure 8. Selected physical data for the disposal wells visited are listed in table 2. Quality-of-water

TABLE 2

SELECTED DATA FOR DISPOSAL WELLS VISITED IN THE IDAHO FALLS AREA

Direction to domestic well: N, north; S, south; W, west; E, east; NE, northeast, SW, southwest; SE, southeast.

Well Number	Date Drilled	Diameter, in Inches	Depth, in Feet	Altitude Above Mean Sea Level, in Feet			Area Drained by Well, in Acres[a]	Distance to Nearest Domestic Well, in Feet, Estimated	Direction to Domestic Well	Remarks
				Land Surface, Estimated	Bottom of Well	Water-Table Surface, Estimated				
Irrigation-Disposal Wells										
6N-36E-35dab1	1920's	48	46	4,760	4,714	4,755	-	2,700	N	Reported depth, 65 ft.
35dab2	1930's	8	96	4,760	4,664	4,755	-	2,700	N	Reported depth, 65 ft.
35dab3	1930's	8	73	4,760	4,687	4,755	-	2,700	N	Reported depth, 65 ft.
35dab4	1930's	8	40	4,760	4,720	4,755	-	2,700	N	Reported depth, 65 ft.
35dab5	1930's	8	56	4,760	4,704	4,755	-	2,700	N	Reported depth, 65 ft.
5N-36E-12bcc1	1920's	8	154	4,757	4,603	4,651	-	5,300	S	Reported depth, 208 ft.
4N-37E-36dcc1	-	-	-	4,762	-	4,650	-	300	W	
4N-38E-15cbb2	1948	6	488	4,805	4,317	4,758	-	200	S	Reported depth, 515 ft.
29ccc1	1960	6	55	4,782	4,727	4,672	-	250	W	Reported depth, 186 ft.
3N-37E- 2dba1	1947	6	87	4,756	4,699	4,598	-	2,600	N	
2ddd1	1947	6	-	4,755	-	4,600	-	2,300	S	
6dad1	-	8	-	4,865	-	4,560	-	600	S	Redrilled in 1971.
11adc1	1961	6	60	4,754	4,694	4,595	80	1,300	NE	

TABLE 2 (Continued)

SELECTED DATA FOR DISPOSAL WELLS VISITED IN THE IDAHO FALLS AREA

Well Number	Date Drilled	Diameter, in Inches	Depth, in Feet	Altitude Above Mean Sea Level, in Feet: Land Surface, Estimated	Altitude Above Mean Sea Level, in Feet: Bottom of Well	Altitude Above Mean Sea Level, in Feet: Water-Table Surface, Estimated	Area Drained by Well, in Acres[a]	Distance to Nearest Domestic Well, in Feet, Estimated	Direction to Domestic Well	Remarks
Irrigation-Disposal Wells (Cont'd.)										
3N-38E- 3bcb1	1940's	6	134	4,797	4,663	4,698	40	500	SW	
3dbc1	1971	-	[b]150	4,806	4,656	4,705	80	2,600	S	
4dcc1	1948	6	143	4,789	4,646	4,689	80	200	S	
7dab1	-	6	110	4,765	4,655	4,655	20	1,000	E	
7dcc1	-	6	73	4,785	4,685	4,650	80	500	SE	Reported depth, 120 ft.
8cdc1	1954	6	99	4,770	4,671	4,655	60	1,550	W	Reported depth, 165 ft.
9abb1	-	6	99	4,790	4,691	4,689	40	200	W	
9cbb1	-	6	-	4,782	-	4,662	-	200	S	Reported depth, 125 ft.
10bab1	-	6	58	4,805	4,747	4,696	-	1,200	W	
10bbb1	-	6	120	4,797	4,677	4,694	-	300	NE	
10cbb1	1940	6	83	4,796	4,713	4,690	15	200	W	Reported depth, 126 ft.
18dab1	-	6	-	4,760	-	4,650	20	1,150	E	
20bcc1	-	-	-	4,755	-	4,646	-	200	SW	
29bbc1	-	6	134	4,752	4,618	4,636	-	200	S	Reported depth, 160 ft.
2bdc1	-	-	-	4,722	-	4,568	-	1,500	NW	Reported plugged.
2cda1	1930	6	[b]140	4,719	4,578	4,568	63	1,200	S	
2N-37E- 2cdd1	1950	6	[b]140	4,719	4,579	4,568	-	650	W	
2dcb1	-	6	67	4,717	4,650	4,570	40	1,400	SE	
2dcd1	-	6	-	4,718	-	4,570	25	300	SE	
10bda1	-	6	122	4,740	4,618	4,560	-	1,700	NW	Same water flows into both wells
10bda2	-	6	135	4,740	4,605	4,560	-	1,700	NW	

TABLE 2 (Continued)

SELECTED DATA FOR DISPOSAL WELLS VISITED IN THE IDAHO FALLS AREA

Well Number	Date Drilled	Diameter, in Inches	Depth, in Feet	Altitude Above Mean Sea Level, in Feet: Land Surface, Estimated	Altitude Above Mean Sea Level, in Feet: Bottom of Well	Altitude Above Mean Sea Level, in Feet: Water-Table Surface, Estimated	Area Drained by Well, in Acres[a]	Distance to Nearest Domestic Well, in Feet, Estimated	Direction to Domestic Well	Remarks
				Irrigation-Disposal Wells (Cont'd.)						
2N-37E-11aba1	-	6	144	4,719	4,575	4,567	12	350	NE	
11abc1	-	6	80	4,723	4,643	4,568	25	1,300	NW	
11baa1	-	6	-	4,720	-	4,568	2	250	W	
11bad1	-	6	82	4,723	4,641	4,567	85	1,150	N	
14bcc1	-	6	75	4,728	4,653	4,561	-	1,200	S	
14ccc2	-	-	-	4,718	-	4,561	-	300	W	
14ccd1	-	-	-	4,718	-	4,561	-	500	E	
14cdc1	1910	6	43	4,716	4,673	4,562	-	200	NW	Reported depth, 100 ft.
14cdc2	-	6	157	4,714	4,557	4,562	-	300	NE	
15adc1	-	6	115	4,724	4,609	4,559	100	1,800	SE	
15dab1	-	6	67	4,723	4,656	4,569	60	1,600	SE	
15dca1	-	6	[b]120	4,717	4,597	4,558	-	1,400	SE	Reported depth, 70 ft.
15dcd1	-	6	66	4,710	4,644	4,588	-	1,300	E	Reported depth, 80 ft.
15ddd1	-	6	[b]70	4,719	4,649	4,560	-	150	E	Well capped, not used.
15ddd2	-	-	[b]80	4,719	4,639	4,560	-	100	S	
19ccb1	1968	8	40	4,710	4,670	4,537	-	1,800	S	Reported depth, 60 ft.
19dcd1	-	6	50	4,688	4,638	4,539	8	200	W	
21acc1	1953	6	35	4,695	4,660	4,551	-	2,600	S	Reported depth, 75 ft.
21bdd1	1935	6	102	4,697	4,595	4,551	-	2,400	NW	
21ddd1	1930	6	161	4,689	4,528	4,552	-	300	E	Reported depth, 80 ft.
22ccc1	-	6	49	4,689	4,640	4,552	-	100	W	
22ddb1	-	6	100	4,699	4,599	4,558	30	800	S	

TABLE 2 (Continued)

SELECTED DATA FOR DISPOSAL WELLS VISITED IN THE IDAHO FALLS AREA

Well Number	Date Drilled	Diameter, in Inches	Depth, in Feet	Altitude Above Mean Sea Level, in Feet: Land Surface, Estimated	Altitude Above Mean Sea Level, in Feet: Bottom of Well	Altitude Above Mean Sea Level, in Feet: Water-Table Surface, Estimated	Area Drained by Well, in Acres[a]	Distance to Nearest Domestic Well, in Feet, Estimated	Direction to Domestic Well	Remarks
				Irrigation-Disposal Wells (Cont'd.)						
2N-37E-23bca1	1937	6	142	4,703	4,561	4,561	-	400	N	Reported depth, 120 ft.
24cba1	-	4	63	4,700	4,637	4,570	-	200	NW	
26bbd1	-	6	83	4,689	4,606	4,561	8	700	W	
26cbc2	1961	6	74	4,689	4,615	4,560	-	450	SE	Driller's log depth, 100 ft.
26ccb1	1961	6	[b]98	4,689	4,591	4,560	-	200	SE	Driller's log.
26cdb1	-	6	110	4,685	4,575	4,561	15	700	W	Reported depth, 100 ft.
27bab1	-	6	[b]95	4,689	4,954	4,554	-	500	N	Well nearly plugged.
27bba1	1925	6	[b]60	4,689	4,629	4,554	-	400	N	
27bbc1	1925	6	54	4,684	4,630	4,552	-	400	SW	
27bac1	-	-	-	4,690	-	4,552	-	350	NW	
27ddc1	1940	6	120	4,684	4,564	4,558	-	450	S	
30bbb1	-	-	-	4,699	-	4,537	-	500	W	Well nearly plugged.
33bcb1	1967	5	91	4,676	4,585	4,545	-	1,150	N	Reported depth, 85 ft.
34acb1	-	6	84	4,673	4,589	4,556	-	1,000	NW	
34cab1	-	8	123	4,669	4,546	4,553	-	1,550	NW	Water cascading into well below surface.
2N-38E-28acc1	-	6	129	4,712	4,583	4,590	80	2,600	SW	
30dcd1	-	4	-	4,703	-	4,578	-	1,300	W	
31abc1	-	6	[b]130	4,701	4,571	4,577	80	1,300	NW	
31acd1	1940's	6	139	4,700	4,561	4,578	40	1,150	E	Reported depth, 130 ft.
31bdc1	-	6	43	4,698	4,655	4,575	40	1,300	SW	Reported depth, 130 ft.
31cdc1	-	6	111	4,694	4,583	[c]4,600	-	1,200	W	Reported depth, 190 ft.

TABLE 2 (Continued)

SELECTED DATA FOR DISPOSAL WELLS VISITED IN THE IDAHO FALLS AREA

Well Number	Date Drilled	Diameter, in Inches	Depth, in Feet	Altitude Above Mean Sea Level, in Feet			Area Drained by Well, in Acres[a]	Distance to Nearest Domestic Well, in Feet, Estimated	Direction to Domestic Well	Remarks
				Land Surface, Estimated	Bottom of Well	Water-Table Surface, Estimated				
Irrigation-Disposal Wells (Cont'd.)										
2N-38E-31dbc1	-	6	101	4,697	4,596	4,576	-	1,800	SE	
31dcc1	1940	8	71	4,693	4,622	4,576	38	450	SE	Reported depth, 135 ft.
32ddc1	1960	6	111	4,699	4,588	4,585	160	900	E	
2N-39E- 7cdc1	-	12	-	4,768	-	4,680	160	350	S	
1N-36E-12adc1	-	6	84	4,650	4,566	4,529	20	1,400	N	
12dab1	-	6	106	4,650	4,544	4,528	20	2,100	S	
1N-37E- 3bbc1	-	6	69	4,665	4,596	4,551		1,050	SW	
3ddb1	1952	6	79	4,658	4,579	4,558	-	950	S	Reported depth, 96 ft.
4ccc1	-	6	96	4,653	4,557	4,540	-	400	N	
5ccd1	1954	6	107	4,644	4,537	4,537	-	850	W	Reported depth, 120 ft.
5dcb1	-	4	51	4,648	4,597	4,538	-	800	S	
6cbc1	-	6	41	4,649	4,608	4,531	7	1,100	SE	
6ccc1	1966	6	162	4,650	4,488	4,531	60	1,200	NE	
8adc1	-	6	-	4,649	-	4,538	15	1,000	NE	
8cbc1	1938	6	-	4,642	-	4,534	-	300	NW	
12acc1	-	6	-	4,669	-	4,571	-	-	-	Well destroyed.
1N-38E- 6acb1	1953	8	131	4,689	4,558	4,576	40	950	S	Reported depth, 135 ft.
7acc1	1957	4	121	4,679	4,558	4,578	80	400	SE	Reported depth, 130 ft.

TABLE 2 (Continued)

SELECTED DATA FOR DISPOSAL WELLS VISITED IN THE IDAHO FALLS AREA

Well Number	Date Drilled	Diameter, in Inches	Depth, in Feet	Altitude Above Mean Sea Level, in Feet: Land Surface, Estimated	Altitude Above Mean Sea Level, in Feet: Bottom of Well	Altitude Above Mean Sea Level, in Feet: Water-Table Surface, Estimated	Area Drained by Well, in Acres[a]	Distance to Nearest Domestic Well, in Feet, Estimated	Direction to Domestic Well	Remarks
Irrigation-Disposal Wells (Cont'd.)										
1N-38E- 7bcd1	-	6	[b]130	4,679	4,549	4,576	80	1,150	W	
7bdd1	-	4	162	4,679	4,515	4,579	80	400	SE	Reported depth, 130 ft.
7cbc1	-	8	134	4,676	4,542	4,572	40	250	W	Reported depth, 130 ft.
City-Street Drain Wells										
2N-37E-13cbc1	-	-	-	4,750	-	4,570				
13cbd1	-	-	-	4,731	-	4,571				
13cbd2	-	-	-	4,731	-	4,571				
14ddd1	1956	6	172	4,740	4,568	4,569				
24cbb1	-	-	-	4,702	-	4,565				
25aac1	1955	-	95	4,693	4,598	4,573				
2N-38E-17aca1	-	-	-	4,729	-	4,590				
17acb1	-	6	95	4,729	4,634	4,590				
17acb2	-	-	-	4,730	-	4,590				
17cbc1	-	8	[b]120	4,724	4,604	4,584	Not determined.	Not determined.	Not determined.	Driller's log.
18bab1	-	8	-	4,715	-	4,581				
18bbb1	-	-	-	4,725	-	4,580				
18bda1	-	8	40	4,715	4,675	4,581				
19acc1	1958	8	[b]135	4,702	4,567	4,580				Driller's log.
20ada1	-	-	-	4,722	-	4,589				

TABLE 2 (Continued)

SELECTED DATA FOR DISPOSAL WELLS VISITED IN THE IDAHO FALLS AREA

Well Number	Date Drilled	Diameter, in Inches	Depth, in Feet	Altitude Above Mean Sea Level, in Feet: Land Surface, Estimated	Altitude Above Mean Sea Level, in Feet: Bottom of Well	Altitude Above Mean Sea Level, in Feet: Water-Table Surface, Estimated	Area Drained by Well, in Acres[a]	Distance to Nearest Domestic Well, in Feet, Estimated	Direction to Domestic Well	Remarks
City-Street Drain Wells (Cont'd.)										
2N-38E-20baa1	-	-	-	4,715	-	4,586	Not determined.	Not determined.	Not determined.	
20dac1	-	6	[b]115	4,718	4,603	4,587				Driller's log.
20dad1	1958	6	81	4,718	4,637	4,588				Reported depth, 134 ft.
20dcc1	-	6	38	4,718	4,680	4,585				
30adc1	-	-	-	4,707	-	4,580				
30cab1	1956	6	[b]155	4,700	4,545	4,575				Driller's log.

[a] Area drained by well as reported by owners.

[b] Reported.

[c] Measured.

data are given in tables 3-7. Figure 8 shows the approximate altitude of the water table (Mundorff and others, 1964) and the inferred direction of ground-water movement in the vicinity of Idaho Falls.

Physical Data

The location and physical characteristics of the 119 disposal wells visited are given in table 2. These wells range in depth from 35 to 488 feet (11 to 149 meters). Well diameters range from 4 to 48 inches (102 to 1,220 millimeters).

Rates of inflow to these disposal wells are given in table 3. The rates range from less than 0.01 to 3.7 cubic feet per second (0.28 to 100 liters per second) and average 0.48 cubic foot per second (2.3 liters per second). Generally, according to reports by farmers, water flows into the irrigation-disposal wells for 24 to 36 hours during each irrigation period, with 8 to 12 periods per season, depending upon the crop being irrigated and the weather. The amount of water needing to be disposed of was reported by well owners to vary greatly during each irrigation period and from year to year. According to them, very little water flows to irrigation-disposal wells in water short years.

Some of the disposal wells, listed in table 2, penetrate the water table thus permitting liquid wastes to be dispersed directly into the ground-water body. Others are terminated in fractured zones above the water table and the liquid wastes in these can move both laterally and vertically depending upon the fracture system. Distances from nearby domestic wells to the disposal wells visited range from 100 to 5,300 feet (30 to 1,615 meters) (table 2).

Quality-of-Water Data

All quality-of-water analyses made on the samples collected are presented in tables 3 to 7. Table 3 provides a listing arranged primarily by type of sampling site and secondarily by location to facilitate comparison of samples collected from selected types of wells. Table 4 provides a listing of selected samples arranged to facilitate a comparison of the chemical character of water entering disposal wells with samples taken of this water at or near its last point of diversion before it enters the field being irrigated. Tables 5, 6, and 7 provide a listing, by location, of selected types of chemical data to facilitate comparison of only these particular parameters.

Because it is beyond the scope of this report, no interpretation of the data presented is made. However, a report on a companion study, which will describe the effects of the use of disposal wells in the Snake River Plain on ground-water quality, is being prepared and will include interpretations of these data.

TABLE 3

QUALITY–OF–WATER DATA FOR SELECTED SITES IN THE IDAHO FALLS AREA

(Chemical constituents in milligrams per liter; microbiological determinations in number of bacteria per 100 milliliters of sample.)

Site Location Number	Date of Collection	Rate of Inflow, in Cubic Feet per Second	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrite plus Nitrate ($NO_2 + NO_3$)	Total Nitrogen, as N	Total Phosphorus, as P	Specific Conductance, in Micromhos at 25°C	pH	Temperature (°C)	Turbidity, in Jackson Turbidity Units	Dissolved Oxygen, in Percent Saturation	Total Coliform Bacteria	Fecal Coliform Bacteria	Fecal Streptococci Bacteria	Total Organic Carbon	Sediment, in Milligrams per Liter
Irrigation-Disposal Wells																						
3N-37E- 2dba1	7-12-73	[a]0.06	42	9.5	7.3	6.5	166	21	5.0	0.05	1.4	0.62	323	7.6	25.0	2	-	520	>80	[a]25,000	10	7
	7-13-73	[a].06	-	-	-	-	-	-	5.0	0	-	-	292	7.5	17.0	4	-	-	100	-	-	9
	4- 2-73	1.6	7.2	1.4	.4	5.6	55	0	1.0	.07	3.5	.84	95	7.5	3.0	2	73	1,600	0	50,000	10	31
2ddd1	7-26-72	.15	-	-	-	-	-	-	5.4	.04	-	-	358	7.2	25.0	7	16	1,400	220	-	-	1
6dad1	4- 5-73	1.5	-	-	-	-	-	-	1.4	.13	-	-	153	7.6	3.5	650	104	36,000	200	480,000	-	5,209
11adc1	7-13-72	.28	-	-	-	-	-	-	7.0	.64	-	-	314	8.0	20.0	30	-	-	560	-	-	66
3N-38E- 3dbc1	6-15-72	1.1	38	7.6	5.4	1.9	140	21	4.2	.19	1.1	.51	268	7.6	17.5	80	-	220	160	3,600	7.0	213
4dcc1	6-13-72	.64	-	-	-	-	-	-	5.0	.09	-	-	283	7.6	12.0	25	-	-	[a]1,000	-	-	65
7dcc1	6- 7-72	[a].84	40	8.7	5.0	8.7	156	24	5.6	.54	1.2	.24	297	7.4	18.5	70	-	3,400	350	[a]26,000	10	98
10cbb1	6-15-72	[a].01	-	-	-	-	-	-	4.0	.03	-	-	267	7.9	14.0	35	-	-	280	-	-	49
18dab1	6-15-72	[a].10	-	-	-	-	-	-	5.0	.03	-	-	274	7.0	27.5	25	-	-	7,300	-	-	58
20bcc1	10- 3-72	[a].08	-	-	-	-	-	-	8.0	.49	-	-	309	8.6	14.0	70	100	[b]1,400	390	980	-	31
29bbc1	6-15-72	[a].01	-	-	-	-	-	-	10	0	-	-	329	[a]7.0	27.5	20	-	-	[a]48,000	-	-	56
2N-37E- 2bdc1	8- 3-72	.22	-	-	-	-	-	-	5.6	.03	-	-	335	8.5	29.5	70	91	18,000	330	-	-	170
2cda1	8- 2-72	.26	-	-	-	-	-	-	5.6	.20	-	-	348	7.4	22.0	25	65	6,000	820	-	-	130
2cdd1	8- 5-72	1.3	-	-	-	-	-	-	5.6	.01	-	-	326	8.0	12.5	4	90	[b]9,500	440	2,500	-	16
2dcb1	9-22-72	< 0.01	-	-	-	-	-	-	7.5	.04	-	-	312	7.1	8.5	15	64	10,000	[b]5	12,000	-	4
2dcd1	8- 5-72	[a].01	-	-	-	-	-	-	5.4	.49	-	-	346	7.4	15.5	30	74	[a]160,000	[a]18,000	7,500	-	173
10bda1	7-27-72	.33	-	-	-	-	-	-	5.2	0	-	-	307	7.6	17.0	9	104	1,300	420	-	-	33
11aba1	9-22-72	>.03	-	-	-	-	-	-	7.4	0	-	-	298	7.1	9.5	10	84	[b]44,000	[b]23	[b]9,000	-	13
11abc1	8- 5-72	.65	-	-	-	-	-	-	5.7	.04	-	-	325	8.2	22.5	95	101	35,000	380	[b]4,000	-	286
11bad1	7-28-72	.24	40	9.1	8.0	3.3	148	23	5.7	.04	.75	.34	315	8.0	25.0	65	126	[b]8,800	[b]5,500	14,000	0	157
14bcc1	7-27-72	[a].02	-	-	-	-	-	-	6.2	2.0	-	-	338	7.8	19.5	80	93	[b]3,500	[b]600	-	-	2,940
14cdc1	8- 4-72	[a].02	-	-	-	-	-	-	5.3	.02	-	-	333	8.1	21.5	60	101	[b]100,000	[b]65	8,000	-	200
	3-20-73	.01	22	3.3	1.1	6.4	89	4.3	1.4	.05	1.6	.31	141	7.8	2.0	7	96	[b]70	0	[b]16,000	12	67
14cdc2	9- 8-72	.64	37	9.0	9.0	4.7	146	27	6.2	.07	.82	.31	294	8.3	21.5	650	95	44,000	1,100	[b]8,000	7.0	331
15adc1	8- 3-72	.27	-	-	-	-	-	-	6.0	.12	-	-	325	7.8	19.0	50	98	[b]50,000	470	-	-	1,190
	4- 4-73	[a].02	-	-	-	-	-	-	2.2	.66	-	-	206	8.2	8.5	120	98	180,000	16	110,000	-	203
15dab1	8- 1-72	.21	38	8.9	8.2	2.7	150	23	5.6	.05	.74	.32	331	8.1	20.5	75	84	12,000	[b]120	2,000	1.0	135
15dca1	9- 7-72	.72	38	9.2	8.9	4.7	145	27	6.3	.08	.51	.17	292	7.7	11.0	700	88	19,000	140	8,800	3.5	129
15dcd1	8- 2-72	.86	-	-	-	-	-	-	5.3	.07	-	-	333	7.5	16.0	5	83	36,000	140	-	-	7
19ccb1	8-15-72	[a]0.01	-	-	-	-	-	-	5.8	0.05	-	-	280	7.0	21.0	3	116	[b]1,700	60	530	-	8
21acc1	9- 8-72	[a].02	-	-	-	-	-	-	6.0	.09	-	-	292	8.2	16.5	260	97	[b]80,000	170	[b]65,000	-	88
26bbd1	9-11-72	.20	-	-	-	-	-	-	7.4	.03	-	-	306	8.0	12.5	350	110	[b]8,500	4,500	8,500	-	236
26cbc2	8-17-72	[a].02	-	-	-	-	-	-	6.0	0	-	-	304	6.8	15.0	-	86	25,000	110	2,900	-	-
26ccb1	6-20-72	.22	-	-	-	-	-	-	4.0	0	-	-	250	7.7	21.0	-	-	-	280	-	-	-
26cdb1	7-26-72	.71	-	-	-	-	-	-	5.6	.04	-	-	327	7.0	17.5	8	78	2,200	290	-	-	34
27bab1	9-10-72	[a].01	-	-	-	-	-	-	6.3	.15	-	-	317	6.8	12.0	20	75	20,000	710	18,000	-	14
27bba1	9-20-72	.45	-	-	-	-	-	-	8.2	.07	-	-	317	7.8	16.0	120	78	5,200	860	[b]6,000	-	49
27bcc1	8-16-72	[a].02	-	-	-	-	-	-	6.5	.07	-	-	348	7.0	28.5	2	30	[b]120,000	230	24,000	-	16
27ddc1	9-17-72	[a].01	-	-	-	-	-	-	5.9	0	-	-	299	8.6	19.5	20	103	3,600	>31	[a]500	-	35
	10- 3-72	[a].10	-	-	-	-	-	-	7.3	2.6	-	-	298	8.0	11.5	15	109	98	8	170	-	2
30bbb1	9-19-72	[a].08	37	9.6	9.8	1.9	144	26	7.0	0	0.39	0.06	296	8.8	15.5	50	94	[b]1,800	330	3,500	1.5	24
33bcb1	9- 9-72	.15	39	9.4	8.9	4.4	148	27	6.0	.07	.72	.28	302	7.7	17.0	110	76	92,000	120	5,200	7.0	7
2N-38E- 28acc1	6-27-72	.77	36	8.0	6.4	2.2	139	17	4.0	.01	.61	.08	259	7.8	23.0	6	-	480	51	3,400	4.0	6

TABLE 3 (Continued)

QUALITY-OF-WATER DATA FOR SELECTED SITES IN THE IDAHO FALLS AREA

Site Location Number	Date of Collection	Rate of Inflow, in Cubic Feet per Second	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrite plus Nitrate ($NO_2 + NO_3$)	Total Nitrogen, as N	Total Phosphorus, as P	Specific Conductance, in Micromhos at 25°C	pH	Temperature (°C)	Turbidity, in Jackson Turbidity Units	Dissolved Oxygen, in Percent Saturation	Total Coliform Bacteria	Fecal Coliform Bacteria	Fecal Streptococci Bacteria	Total Organic Carbon	Sediment, in Milligrams per Liter
Irrigation-Disposal Wells (Cont'd.)																						
2N-38E- 30dcd1 (11:00 a.m.)																						
	6-22-72	[a].04	-	-	-	-	-	-	4.0	0	-	-	262	7.6	20.0	-	-	-	280	-	-	-
	(12:00 Noon)																					
	6-22-72	.98	-	-	-	-	-	-	5.0	.03	-	-	269	7.6	21.5	-	-	-	550	-	-	-
31abc1	6-20-72	3.7	35	7.5	5.9	2.5	134	17	4.0	.07	2.1	.76	234	7.0	21.0	20	-	880	180	17,000	4.5	36
31acd1	6-22-72	1.2	-	-	-	-	-	-	-	-	-	-	272	7.0	26.0	-	-	-	70	-	-	-
31bdc1	6-28-72	.89	-	-	-	-	-	-	6.0	.15	-	-	256	7.6	21.0	-	-	-	110	-	-	-
31dcc1	6-22-72	.34	-	-	-	-	-	-	4.0	.09	-	-	253	7.0	26.0	-	-	-	260	-	-	-
32ddc1	6-22-72	[a]1.1	35	7.6	6.1	1.9	138	17	3.9	.05	.37	.25	246	7.5	12.5	10	-	390	180	1,700	3.0	14
2N-39E- 7cdc1	4- 6-73	[a]1.0	-	-	-	-	-	-	2.4	.19	-	-	121	7.5	3.0	700	97	-	-	-	-	579
1N-37E- 4ccc1	9- 9-72	[a].05	41	11	8.9	5.2	153	26	6.7	.02	.57	.52	310	7.8	15.5	10	70	>[a]100,000	330	25,000	5.5	7
5ccd1	9-21-72	[a].04	-	-	-	-	-	-	8.0	.09	-	-	321	8.2	20.0	60	94	24,000	270	3,000	-	17
5dcb1	10- 5-72	[a].01	-	-	-	-	-	-	8.0	1.4	-	-	297	8.5	10.0	390	129	250	[b]180	1,000	-	95
6cbc1	3-20-73	[a].02	16	3.2	2.8	3.1	70	4.5	1.2	.24	3.1	1.2	109	8.7	1.0	75	98	[b]180	0	[b]190,000	20	1,166
1N-38E- 6acb1	6-21-72	.41	33	7.4	5.9	2.1	137	17	4.0	0	.55	.17	265	7.6	21.0	25	-	[b]1,900	[b]82	[b]1,800	8.5	45
7acc1	7-25-72	.89	-	-	-	-	-	-	5.1	.04	-	-	284	7.9	19.5	95	104	330	[b]50	-	-	386
7bcd1	6-28-72	.78	-	-	-	-	-	-	7.0	0	-	-	254	7.0	26.0	-	-	7,000	460	4,800	-	-
	6-29-72	1.5	35	7.7	6.4	1.8	133	17	4.0	.03	.66	.15	251	7.0	23.5	25	-	-	660	-	4.5	46
7bdd1	7-25-72	2.4	-	-	-	-	-	-	5.4	.07	-	-	291	7.4	21.5	150	98	2,200	220	-	-	1,600
City-Street Drain Wells																						
2N-37E- 13cbc1	[c]12-20-72	-	20	1.5	180	2.9	81	11	280	0.44	3.3	0.82	1,010	7.0	0.5	-	-	3,800	[b]200	25,000	-	-
	[c]12-21-72	-	-	-	-	-	-	-	32	-	-	-	215	-	.5	1,000	-	5,300	[a]60	-	-	1,126
	[c]12-22-72	-	-	-	-	-	-	-	23	-	-	-	175	-	1.0	1,000	-	5,900	180	-	-	124
13cbd1	[c]12-21-72	-	-	-	-	-	-	-	73	-	-	-	363	-	.5	1,100	-	2,200	[a]60	-	-	312
	[c]12-22-72	-	-	-	-	-	-	-	28	-	-	-	167	-	1.0	1,000	-	4,100	[b]20	-	-	36
14ddd1	10-10-72	[a]0.10	-	-	-	-	-	-	1.0	.07	-	-	56	6.2	9.5	80	-	[b]24,000	[b]410	[b]1,100	-	33
	3-22-73	.05	12	1.2	3.1	2.4	47	5.4	3.3	.27	2.0	.48	108	8.2	4.0	15	104	[b]30	0	[b]1,100	-	56
24ebb1	3-22-73	[a].01	-	-	-	-	-	-	3.8	.26	-	-	114	8.2	9.0	20	92	-	-	-	-	55
2N-38E- 17acb2	[c]12-20-72	-	15	2.0	60	5.3	40	9.2	100	.62	3.4	.50	446	6.5	.5	-	-	[b]200	0	-	-	-
	[c]12-21-72	-	-	-	-	-	-	-	38	-	-	-	323	-	.5	1,000	-	2,400	520	-	-	538
	[c]12-22-72	-	-	-	-	-	-	-	11	-	-	-	446	-	.5	1,000	-	2,900	[b]40	-	-	489
17cbc1	3-21-73	.01	-	-	-	-	-	-	1.5	.27	-	-	81	8.3	5.0	35	99	25	0	10,000	-	89
18bab1	8-15-72	[a].01	-	-	-	-	-	-	9.5	.54	-	-	155	7.0	28.0	60	83	[a]730,000	[a]27,000	[a]20,000	-	128
	[c]12-21-72	-	-	-	-	-	-	-	290	-	-	-	1,068	-	1.0	1,300	-	2,200	0	-	-	1,863
	[c]12-22-72	-	-	-	-	-	-	-	70	-	-	-	471	-	.5	1,300	-	17,000	940	-	-	929
	3-22-73	-	-	-	-	-	-	-	19	.58	-	-	180	8.5	6.0	800	97	-	-	-	-	1,170
19acc1	3-22-73	[a].05	-	-	-	-	-	-	20	.50	-	-	196	8.2	4.0	200	92	-	-	-	-	152
20ada1	10-10-72	[a].01	-	-	-	-	-	-	.9	.05	-	-	56	6.2	10.0	25	-	[a]210,000	[a]100	[a]1,800	-	7
20baa1	10-10-72	[a].01	-	-	-	-	-	-	.7	.05	-	-	46	6.1	10.0	40	-	[a]36,000	[a]280	[a]6,500	-	6
20dac1	[c]12-20-72	-	16	1.1	170	2.1	40	8.8	270	.56	2.7	.50	950	6.6	.5	-	-	[b]100	0	5,800	-	-
	[c]12-21-72	-	-	-	-	-	-	-	96	-	-	-	382	-	1.0	1,000	-	4,000	480	-	-	68
	[c]12-22-72	-	-	-	-	-	-	-	11	-	-	-	135	-	.5	1,000	-	4,400	[b]280	-	-	1,550
20dad1	3-21-73	.05	-	-	-	-	-	-	2.0	.16	-	-	61	8.6	4.0	35	107	80	5	2,500	-	40
20dcc1	3-21-73	[a].10	-	-	-	-	-	-	5.4	.37	-	-	87	8.7	0	320	105	[b]400	-	[b]9,800	-	543
30adc1	[c]12-21-73	-	-	-	-	-	-	-	7.7	-	-	-	129	-	1.0	1,200	-	8,200	[a]20	-	-	450
	[c]12-22-73	-	-	-	-	-	-	-	13	-	-	-	184	-	.5	1,200	-	17,000	100	-	-	504

TABLE 3 (Continued)

QUALITY–OF–WATER DATA FOR SELECTED SITES IN THE IDAHO FALLS AREA

Site Location Number	Date of Collection	Rate of Inflow, in Cubic Feet per Second	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrite plus Nitrate ($NO_2 + NO_3$)	Total Nitrogen, as N	Total Phosphorus, as P	Specific Conductance, in Micromhos at 25°C	pH	Temperature (°C)	Turbidity, in Jackson Turbidity Units	Dissolved Oxygen, in Percent Saturation	Total Coliform Bacteria	Fecal Coliform Bacteria	Fecal Streptococci Bacteria	Total Organic Carbon	Sediment, in Milligrams per Liter
Snake River																						
2N-37E-24ada1	9-28-72	-	-	-	-	-	-	-	-	0	0.40	0.04	295	8.3	9.5	3	100	65	[b]35	-	-	-
	11- 2-72	-	-	-	-	-	-	-	-	0.10	1.1	.08	299	8.2	4.0	2	104	52	[b]36	-	2.0	-
	11-29-72	-	-	-	-	-	-	-	-	.15	.37	.03	282	8.3	4.0	2	116	30	-	-	-	-
	12-28-72	-	-	-	-	-	-	-	-	.21	.36	.04	314	8.0	.5	2	113	29	13	-	2.0	-
	1-24-73	-	-	-	-	-	-	-	-	.16	.33	.05	365	7.6	0	1	108	37	[b]12	-	1.0	-
1N-37E-17eda1	6-26-72	-	32	7.6	5.9	1.5	131	19	4.9	.09	-	.08	246	8.1	13.0	-	-	-	-	-	-	-
	9-13-72	-	35	9.5	9.9	1.8	143	27	7.3	.03	-	.04	302	7.4	12.5	-	-	-	-	-	-	-
Canals																						
[d]6N-36E-35dad1	4- 3-73	-	48	15	41	4.3	292	8.3	16	.28	.95	.10	489	8.0	6.5	10	115	[b]240	[b]4	[b]500	10	39
3N-37E-13bca1	7-12-72	-	39	9.0	7.1	1.6	157	21	5.0	.11	.34	.07	279	8.3	17.0	9	-	62	-	100	3.5	29
	7-13-72	-	-	-	-	-	-	-	5.0	.04	-	-	280	8.0	17.0	8	-	-	[b]13	-	-	28
2N-38E-29cbc1	6-21-72	-	-	-	-	-	-	-	4.0	.04	-	-	248	7.0	15.5	-	-	-	120	-	-	-
1N-38E-6acb2	6-21-72	-	-	-	-	-	-	-	-	-	-	-	255	7.4	16.0	-	-	-	[b]29	-	-	-
7bbb1	6-28-72	-	-	-	-	-	-	-	-	-	-	-	250	7.0	20.5	-	-	-	12	-	-	-
	6-29-72	-	34	8.0	6.4	1.5	134	17	4.0	.06	.63	.08	250	7.0	18.0	15	-	380	180	310	1.5	47
Diversion Ditch																						
2N-37E-27bba2	9-20-72	-	-	-	-	-	-	-	6.8	0	-	-	285	8.1	14.0	30	100	[b]800	[b]4	180	-	20
Domestic-Supply Well																						
2N-37E-14ccc1	8-17-72	-	71	22	19	3.6	301	45	11	1.9	2.1	.03	533	7.0	11.5	.2	99	0	0	0	0	3
	3-14-73	-	71	22	18	3.5	301	40	11	1.9	2.2	.03	605	-	12.0	-	-	0	0	0	-	-

[a] Estimated value.
[b] Results based on colony count outside the acceptable range.
[c] Sample collected by the Idaho Department of Water Resources.
[d] Canal distributes water from wildlife refuge lands to a system of five disposal wells.
> Actual value known to be greater than value shown.
< Actual value known to be less than value shown.

TABLE 4

COMPARISON OF WATER AT OR NEAR THE LAST POINT OF DIVERSION WITH WATER AT THE DISPOSAL WELL

Site Location Number	Date of Collection	Rate of Inflow or Discharge, in Cubic Feet per Second	Chloride (Cl), in Milligrams per Liter	Nitrite plus Nitrate (NO_2+NO_3), in Milligrams per Liter	Specific Conductance, in Micromhos at 25°C	pH	Temperature (°C)	Turbidity, in Jackson Turbidity Units	Dissolved Oxygen, in Milligrams per Liter	Dissolved Oxygen, in Percent of Saturation	Number of Bacteria per 100 Milliliters of Sample: Total Coliform Bacteria	Number of Bacteria per 100 Milliliters of Sample: Fecal Coliform Bacteria	Number of Bacteria per 100 Milliliters of Sample: Fecal Streptococci Bacteria	Sediment, in Milligrams per Liter	Remarks
3N-37E- 2dba1	7-12-72	[a]0.06	5.0	0.05	323	7.6	25.0	2	-	-	520	>80	[a]25,000	7	Well
13bca1	7-12-72	595	5.0	.11	279	8.3	17.0	9	-	-	62	-	100	29	Canal
		-	0	-.06	+44	-.7	+8.0	-7	-	-	+458	-	+24,900	-22	
2N-37E-27bba1	9-20-72	.45	8.2	.07	317	7.8	16.0	120	6.6	78	5,200	860	6,000	49	Well
27bba2	9-20-72	1.40	6.8	.00	285	8.1	14.0	30	8.7	100	800	4	180	20	Diversion ditch[b]
		-.95	+1.4	+.07	+32	-0.3	+2.0	+90	-2.1	-22	+4,400	+856	+5,220	+29	Change at well
1N-38E- 7bcd1	6-29-72	1.5	4.0	.03	251	7.0	23.5	25	-	-	7,000	460	4,800	46	Well
7bbb1	6-29-72	[a]75	4.0	.06	250	7.0	18.0	15	-	-	380	180	310	47	Canal
		-	0	.03	-1	0	+5.5	+10	-	-	+6,620	+280	+4,490	-1	Change at well

> Actual value is known to be greater than value shown.

[a] Estimated value.

[b] Diversion ditch is located about 600 feet northwest of well; the entire discharge shown was diverted onto the field that was drained by the disposal well.

TABLE 5

CONCENTRATIONS OF OIL, GREASE, AND DISSOLVED[1/] LEAD IN SAMPLES FROM SELECTED SITES

Site Location Number	Date of Collection	Oil and Grease, in Milligrams per Liter	Dissolved Lead, in Micrograms per Liter	Remarks
2N-37E-13cbc1	[a]12-20-72	1,300	19	Street, storm runoff sample.
14ddd1	3-22-73	13	100	Street, storm runoff sample.
15adc1	[b]4- 4-73	4	< 100	Irrigation-waste water sample.
24cbb1	3-22-73	13	200	Street, storm runoff sample.
2N-38E-17acb2	[a]12-20-72	4,000	520	Street, storm runoff sample.
17cbc1	3-21-73	12	200	Street, storm runoff sample.
18bab1	3-22-73	150	500	Street, storm runoff sample.
19acc1	3-22-73	100	600	Street, storm runoff sample.
20dac1	[a]12-20-72	11	39	Street, storm runoff sample.
20dad1	3-21-73	13	200	Street, storm runoff sample.
20dcc1	3-21-73	38	1,600	Street, storm runoff sample.

1/ Values determined on sample passing 0.45 micrometer filter; may include finely divided particulate matter.

< Actual value known to be less than value shown.

a Sample collected by the Idaho Department of Water Resources.

b Snowmelt runoff flowing into an irrigation-disposal well.

TABLE 6

PESTICIDE ANALYSES OF SAMPLES FROM SELECTED SITES[1/]

(Insecticide and herbicide constituents, in micrograms per liter.)

Site Location Number	Date of Collection	Rate of Inflow, in Cubic Foot per Second	INSECTICIDES					HERBICIDES		Remarks
			Chlordane	DDE	DDT	Diazinon	Dieldrin	2,4-D	Silvex	
3N-38E-20bcc1	10 3-72	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Irrigation-waste water sample
2N-37E-14ddd1	10-10-72	<.10	.03	.01	.04	.01	.01	.26	.02	Street, storm-runoff sample [2/]
15adc1	8-15-72	.50	.00	.02	.01	.00	.00	.00	.00	Irrigation-waste water sample [3/]
27ddc1	10- 3-72	.10	.00	.00	.00	.00	.00	.00	.00	Irrigation-waste water sample [3/]

[1/] Insecticides and herbicides analyzed for, but not detected in the samples included aldrin, DDD, endrin, heptachlor, heptachlor epoxide, lindane, parathion, methyl parathion, malathion, 2,4,5-T, and polychlorinated biphenyl (PCB) compounds.

[2/] The area drained by this well is a relatively new (less than 10 years old) residential area consisting of well established lawns and new construction.

[3/] The land drained by this well was planted in potatoes and was sprayed with chemicals by aircraft 12 days prior to collection date. A rain storm occurred several hours prior to collection of sample.

< Actual value known to be less than value shown.

TABLE 7

STANDARD CHEMICAL ANALYSES OF WATER FROM SELECTED SITES

(Chemical constituents, in milligrams per liter.)

Site Location Number	Date of Collection	Silica (SiO_2)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Alkalinity, as $CaCO_3$	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrite plus Nitrate ($NO_2 + NO_3$)	Total Nitrogen, as N	Total Phosphorus, as P	Dissolved Solids (sum of constituents)	Hardness, as Ca, Mg	Percent Sodium	Sodium Adsorption Ratio (SAR)	Specific Conductance, in Micromhos at 25°C	pH	Temperature (°C)	Total Organic Carbon
Irrigation-Disposal Wells																						
3N-37E- 2dba1	7-12-73	20	42	9.5	7.3	6.5	166	136	21	5.0	0.6	0.05	1.4	0.62	195	140	9	0.3	323	7.6	25.0	10
	4- 2-73	4.2	7.2	1.4	.4	5.6	55	45	0	1.0	.1	.07	3.5	.84	52	24	3	0	95	7.5	3.0	10
3N-38E- 3dbc1	6-15-72	8.8	38	7.6	5.4	1.9	140	115	21	4.2	.3	.19	1.1	.51	157	130	8	.2	268	7.6	17.5	7.0
7dcc1	6- 7-72	10	40	8.7	5.0	8.7	156	128	24	5.6	.4	.54	1.2	.24	180	140	10	.3	297	7.4	18.5	10
2N-37E-11bad1	7-28-72	12	40	9.1	8.0	3.3	148	121	23	5.7	.7	.04	.75	.34	175	140	11	.3	315	8.0	25.0	0
14cdc1	3-20-73	12	22	3.3	1.1	6.4	89	73	4.3	1.4	.2	.05	1.6	.31	95	69	3	.1	141	7.8	2.0	12
14cdc2	9- 8-72	16	37	9.0	9.0	4.7	146	120	27	6.2	1.0	.07	.82	.31	182	130	13	.3	294	8.3	21.5	7.0
15dab1	8- 1-72	13	38	8.9	8.2	2.7	150	123	23	5.6	.7	.05	.74	.32	174	130	12	.3	331	8.1	20.5	1.0
15dca1	9- 7-72	16	38	9.2	8.9	4.7	145	119	27	6.3	.9	.08	.51	.17	183	130	12	.3	292	7.7	11.0	3.5
30bbb1	9-19-72	14	37	9.6	9.8	1.9	144	118	26	7.0	.8	0	.39	.06	177	130	14	.4	296	8.8	15.5	1.5
33bcb1	9- 9-72	16	39	9.4	8.9	4.4	148	121	27	6.0	1.0	.07	.72	.28	185	140	12	.3	302	7.7	17.0	7.0
2N-38E-28acc1	6-27-72	12	36	8.0	6.4	2.2	139	114	17	4.0	.4	.01	.61	.08	154	120	10	.3	259	7.8	23.0	4.0
31abc1	6-20-72	11	35	7.5	5.9	2.5	134	110	17	4.0	.4	.07	2.1	.76	150	120	10	.2	234	7.0	21.0	4.5
32ddc1	6-22-72	11	35	7.6	6.1	1.9	138	113	17	3.9	.4	.05	.37	.25	152	120	10	.2	246	7.5	12.5	3.0
1N-37E- 4ccc1	9- 9-72	16	41	11	8.9	5.2	153	126	26	6.7	1.0	.02	.57	.52	193	150	11	.3	310	7.8	15.5	5.5
6cbc1	3-20-73	3.3	16	3.2	2.8	3.1	70	57	4.5	1.2	.3	.24	3.1	1.2	70	53	10	.2	109	8.7	1.0	20
1N-38E- 6acb1	6-21-72	11	33	7.4	5.9	2.1	137	112	17	4.0	.4	0	.55	.17	148	110	10	.2	265	7.6	21.0	8.5
7bcd1	6-29-72	12	35	7.7	6.4	1.8	133	109	17	4.0	.5	.03	.66	.15	150	120	10	.3	251	7.0	23.5	4.5
City-Street Drain Wells																						
2N-37E-13cbc1	[a]12-20-72	1.9	20	1.5	180	2.9	81	66	11	280	.3	.44	3.3	.82	540	56	87	10	1,010	7.0	.5	-
14ddd1	3-22-73	2.7	12	1.2	3.1	2.4	47	39	5.4	3.3	.1	.27	2.0	.48	56	35	15	.2	108	8.2	4.0	-
2N-38E-17acb2	[a]12-20-72	2.4	15	2.0	60	5.3	40	33	9.2	100	.2	.62	3.4	.50	217	46	71	3.9	446	6.5	.5	-
20dac1	[a]12-20-72	1.3	16	1.1	170	2.1	40	33	8.8	270	.2	.56	2.7	.50	492	44	89	11	950	6.6	.5	-
Snake River																						
1N-37E-17cda1	6-26-72	12	32	7.6	5.9	1.5	131	107	19	4.9	.2	.09	-	.08	148	110	10	.2	246	8.1	13.0	-
	9-13-72	15	35	9.5	9.9	1.8	143	117	27	7.3	.9	.03	-	.04	177	130	14	.4	302	7.4	12.5	-
Canals																						
[b]6N-36E-35dad1	4- 3-73	26	48	15	4.1	4.3	292	240	8.3	16	1.8	.28	.95	.10	306	180	32	1.3	489	8.0	6.5	10
3N-37E-13bca1	7-12-72	12	39	9.0	7.1	1.6	157	129	21	5.0	.5	.11	.34	.07	173	130	10	.3	279	8.3	17.0	3.5
1N-38E- 7bbb1	6-29-72	12	34	8.0	6.4	1.5	134	110	17	4.0	.4	.06	.63	.08	149	120	10	.3	250	7.0	18.0	1.5
Domestic Well																						
2N-37E-14ccc1	8-17-72	25	71	22	19	3.6	301	247	45	11	.5	1.9	2.1	.03	354	270	13	.5	533	7.0	11.5	0
	3-14-73	24	71	22	18	3.5	301	247	40	11	.4	1.9	2.2	.03	347	270	13	.5	605	7.6	12.0	-

[a] Sample collected by Idaho Department of Water Resources.

[b] Canal distributes water from wildlife refuge lands to a system of five disposal wells.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE
IDAHO DEPARTMENT OF WATER ADMINISTRATION

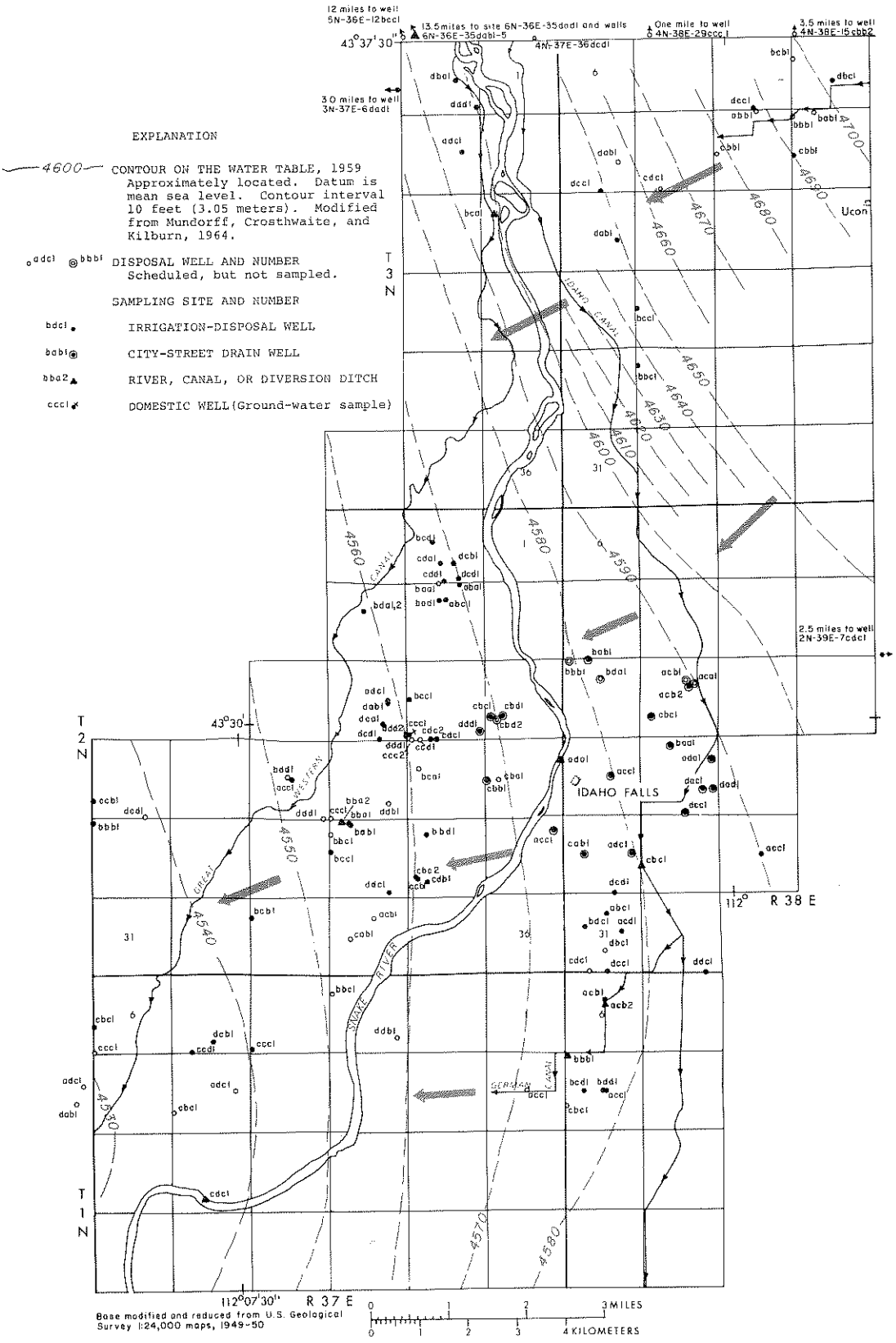


FIGURE 8. LOCATIONS OF SELECTED DISPOSAL WELLS, SAMPLING SITES, AND CONTOURS ON THE WATER TABLE IN THE IDAHO FALLS AREA.

REFERENCES CITED

Abegglen, D. E., Wallace, A. T., and Williams, R. E., 1970, The effects of drain wells on the ground-water quality of the Snake River Plain: Idaho Bur. Mines and Geology Pamphlet 148, 51 p.

Barraclough, J. T., Teasdale, W. E., and Jensen, R. G., 1967, Hydrology of the National Reactor Testing Station, Idaho annual progress report, 1965: U. S. Geol. Survey open-file report, Feb. 1967, 107 p.

Barraclough, J. T., Teasdale, W. E., Robertson, J. B., and Jensen, R. G., 1966, Hydrology of the National Reactor Testing Station, Idaho: U. S. Geol. Survey open-file report, Oct. 1967, 95 p.

Bondurant, J. A., 1971, Quality of surface irrigation runoff water: Transactions of the American Society of Agricultural Engineers 1971, v. 14, no. 6, p. 1001-1003.

Crosby, J. W. III, Johnstone, D. L., Drake, C. H., and Fenton, R. L., 1968, Migration of pollutants in a glacial outwash environment: Water Resources Research, v. 4, no. 5, Oct. 1968, p. 1095-1114.

Idaho Department of Water Administration 1971, Water laws and regulations: Volume 1, 1971, sec. 42-3902, p. 157.

McGauhey, P. H., 1968, Engineering management of water quality, McGraw-Hill Book Company, New York, New York, 295 p.

Mundorff, M. J., Crosthwaite, E. G., and Kilburn, Chabot, 1964, Ground water for irrigation in the Snake River basin in Idaho: U. S. Geol. Survey Water-Supply Paper 1654, 224 p.

Perlmutter, N. M., and Guerrera, A. A., 1970, Detergents and associated contaminants in ground water at three public-supply well fields in southwestern Suffolk County, Long Island, New York: U. S. Geol. Survey Water-Supply Paper 2001-B, 22 p.

Scalf, M. R., and others, 1968, Fate of DDT and nitrate in ground water: U. S. Dept. of the Interior, Federal Water Pollution Control Administration, Robert S. Kerr Water Research Center, Ada, Oklahoma and U. S. Dept. of Agricultural Soil and Water Conservation Division, Agricultural Research Service, Southwestern Great Plains Research Center, Bushland, Texas, April 1968, 46 p.

Sceva, J. E., 1968, Liquid waste disposal in the lava terrane of central Oregon: U. S. Environmental Protection Agency, Pacific Northwest Water Laboratory, Technical Projects Branch report no. FR-4, 1968, 66 p.

Smith, J. H., and Douglas, C. L., 1973, Microbiological quality of surface drainage water from three small irrigated watersheds in southern Idaho: Jour. Environmental

Quality, 1973, v. 2, no. 1, p. 110-112.

Vecchioli, John, Ehrlich, G. G., and Ehlke, T. A., 1972, The travel of pollution-indicator bacteria through the Magothy aquifer, Long Island, New York: U. S. Geol. Survey Prof. Paper 800-B, p. B237-B239.